Lessons Learned from a Collaborative Approach to Watershed Restoration

Friends of the Cheat

EPA Volunteer Monitoring Conference
August 10, 2013

Kevin Ryan

Outline

- Friends of the Cheat
  - History and Mission
  - Programs
    - Projects
  - Partnership Types
- Targeted Watershed Initiative
  - Project Overview
- FOC Volunteer Monitoring Program
  - Overview
- Partnership Framework
  - Lessons Learned
- Summary
- Questions/Discussion

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History and Mission

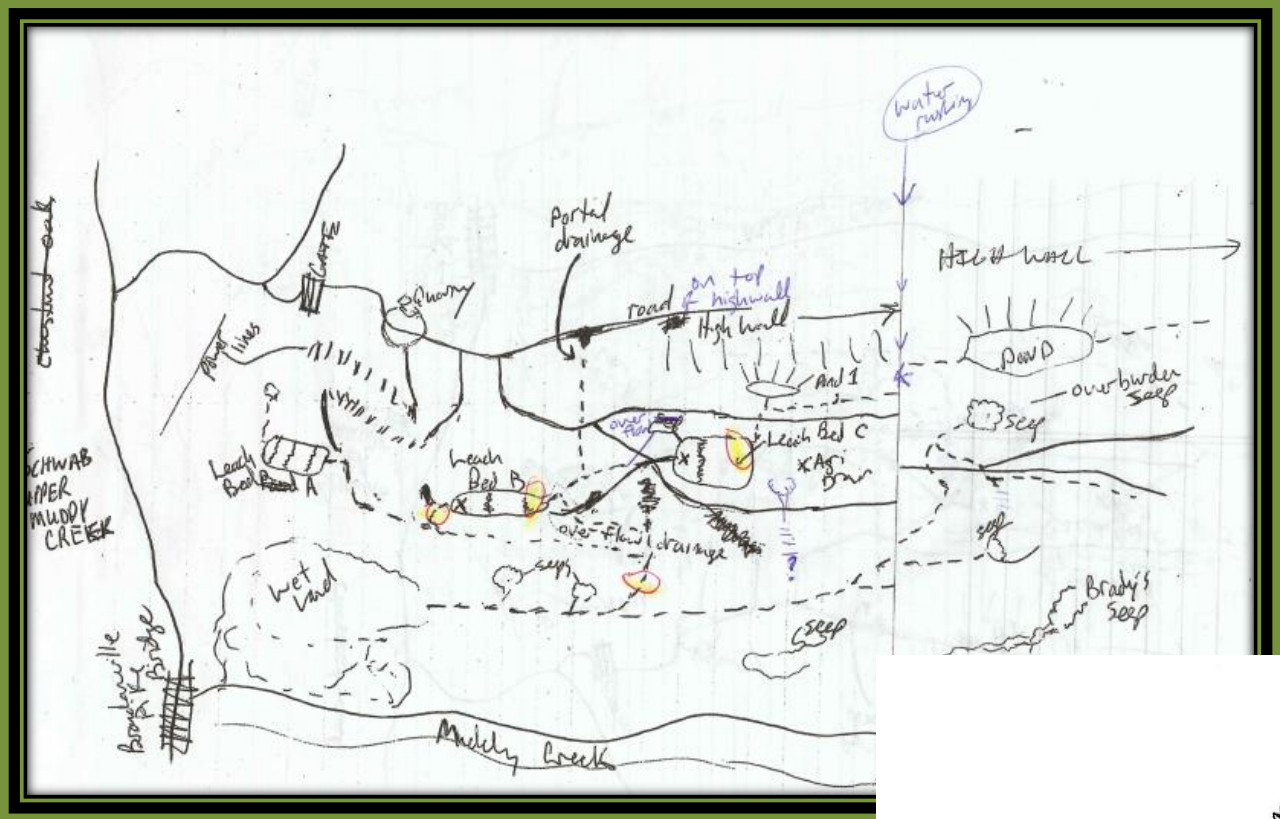
“To restore, preserve, and promote the outstanding qualities of the Cheat River watershed”

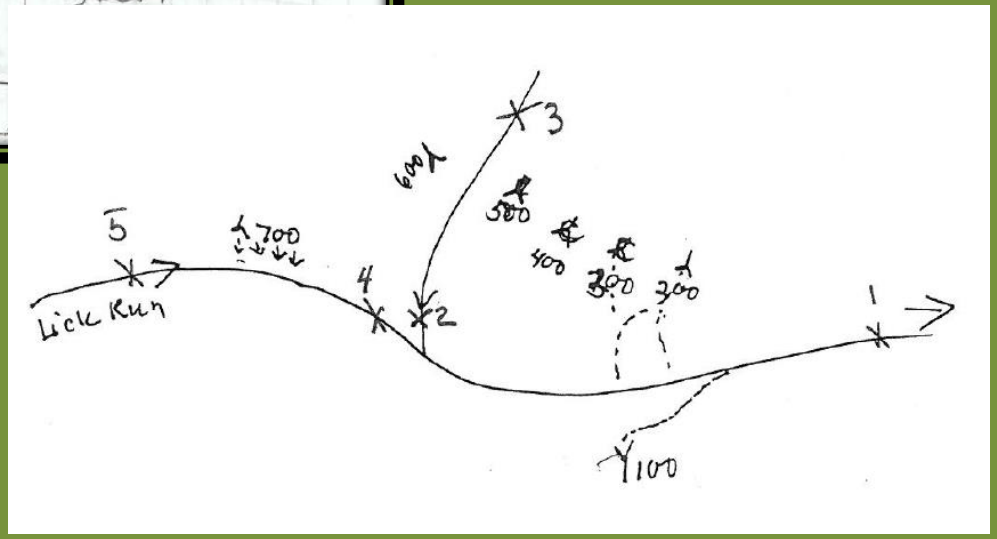
Programs

1. Restoration

Acid Mine Drainage Reconnaissance

Pre-project Planning





Treatment Design

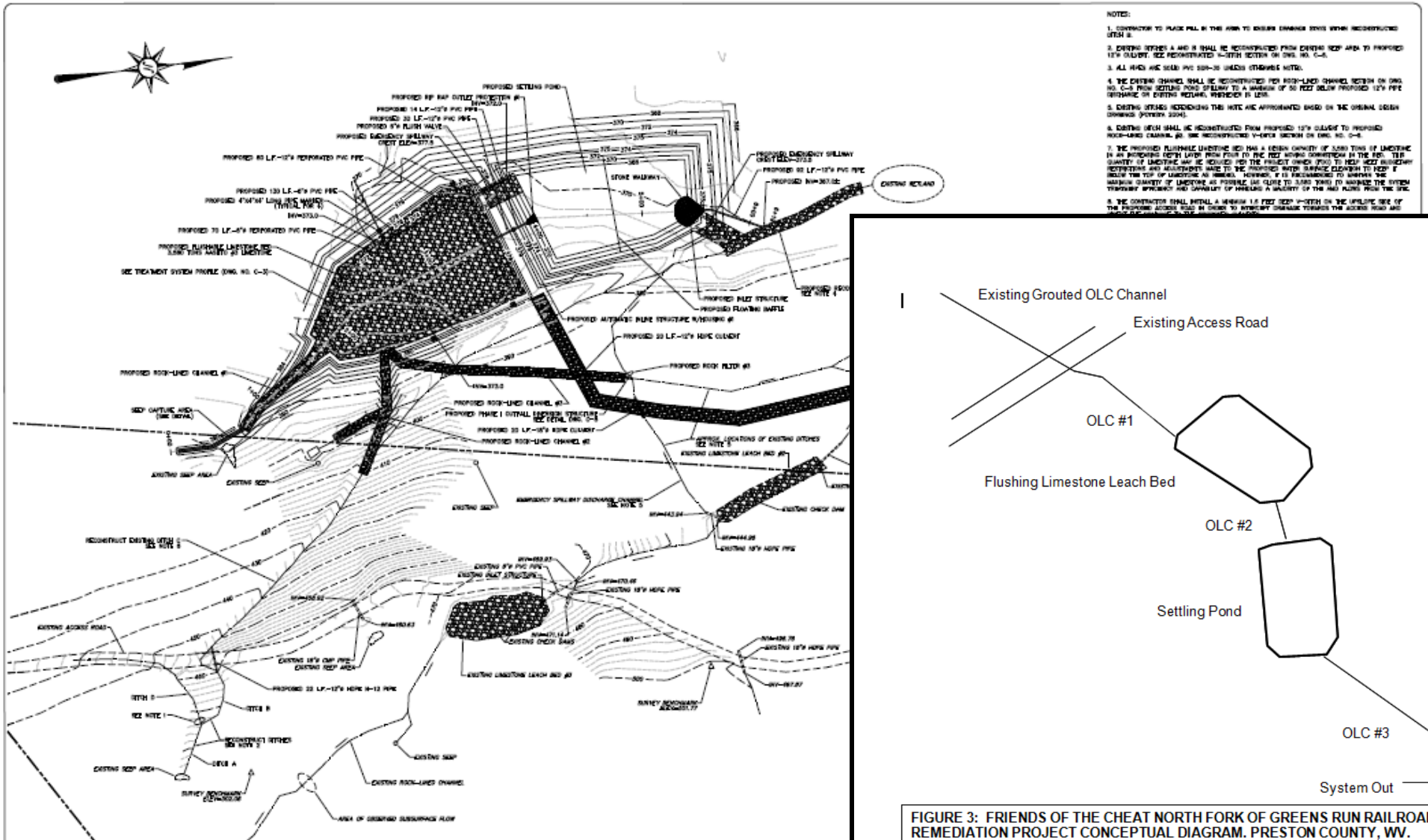


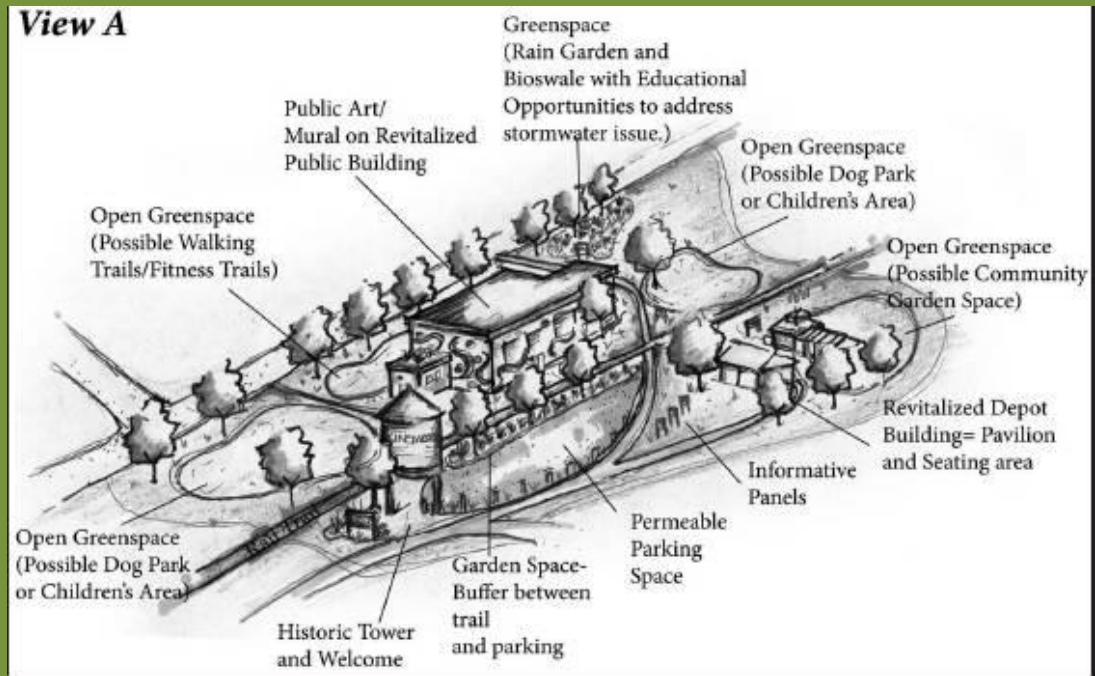
FIGURE 3: FRIENDS OF THE CHEAT NORTH FORK OF GREENS RUN RAILROAD REMEDIATION PROJECT CONCEPTUAL DIAGRAM. PRESTON COUNTY, WV.

Construction and Project Monitoring and Maintenance

2. Recreation and River Access

Program Development

- Brownfields Revitalization
- Place-based Environmental Education
  - Doug Ferris Outdoor Classroom
- Preservation and Conservation



Diversification of programs and projects means….

More diverse partnerships!

Governmental

- West Virginia Department of Environmental Protection
  - Nonpoint Source Program
  - Office of Special Reclamation
  - Abandoned Mine Lands and Reclamation
- West Virginia Division of Natural Resources
- US Environmental Protection Agency Region III

Private/Industry

- Landowners
- Funded $200K of FOC's 1st AMD Treatment Project - Anker Energy
- Assisted with FOC property acquisition - Patriot Coal

Engineers

Academia

- West Virginia University
  - National Mine Land Reclamation Center
    - Water Research Institute

Stanford University

WVU - Division of Natural Resources and Forestry researchers

Volunteers


RIVER OF PROMISE
A Shared Commitment
Watershed

Partnership Framework

1. Communication
2. Roles and Responsibilities
3. Strategic Planning

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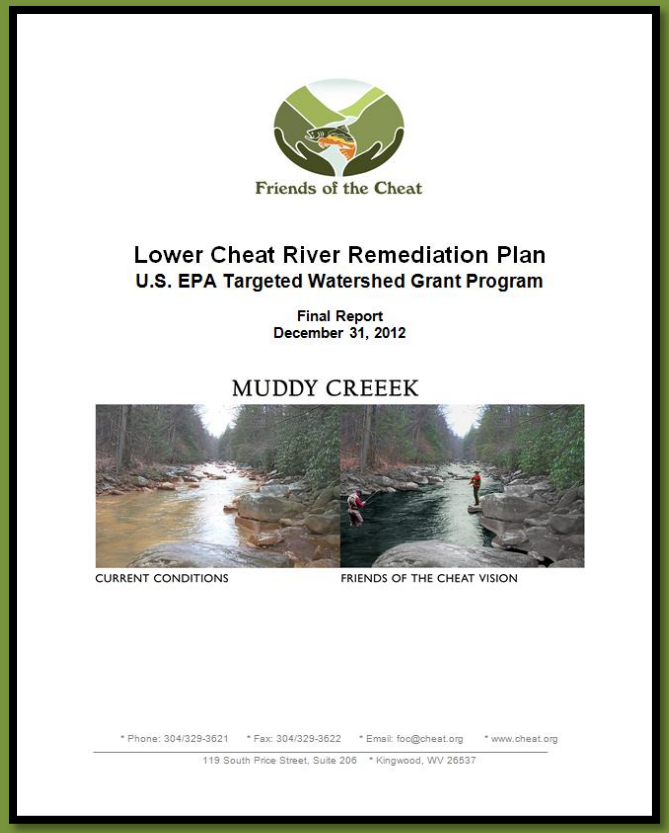
Lower Cheat River Remediation Plan
U.S. EPA
Targeted Watershed Grant Program

2004 – 2012
$1.5 million



Friends of the Cheat

Lower Cheat River Remediation Plan
U.S. EPA Targeted Watershed Grant Program

Final Report
December 31, 2012

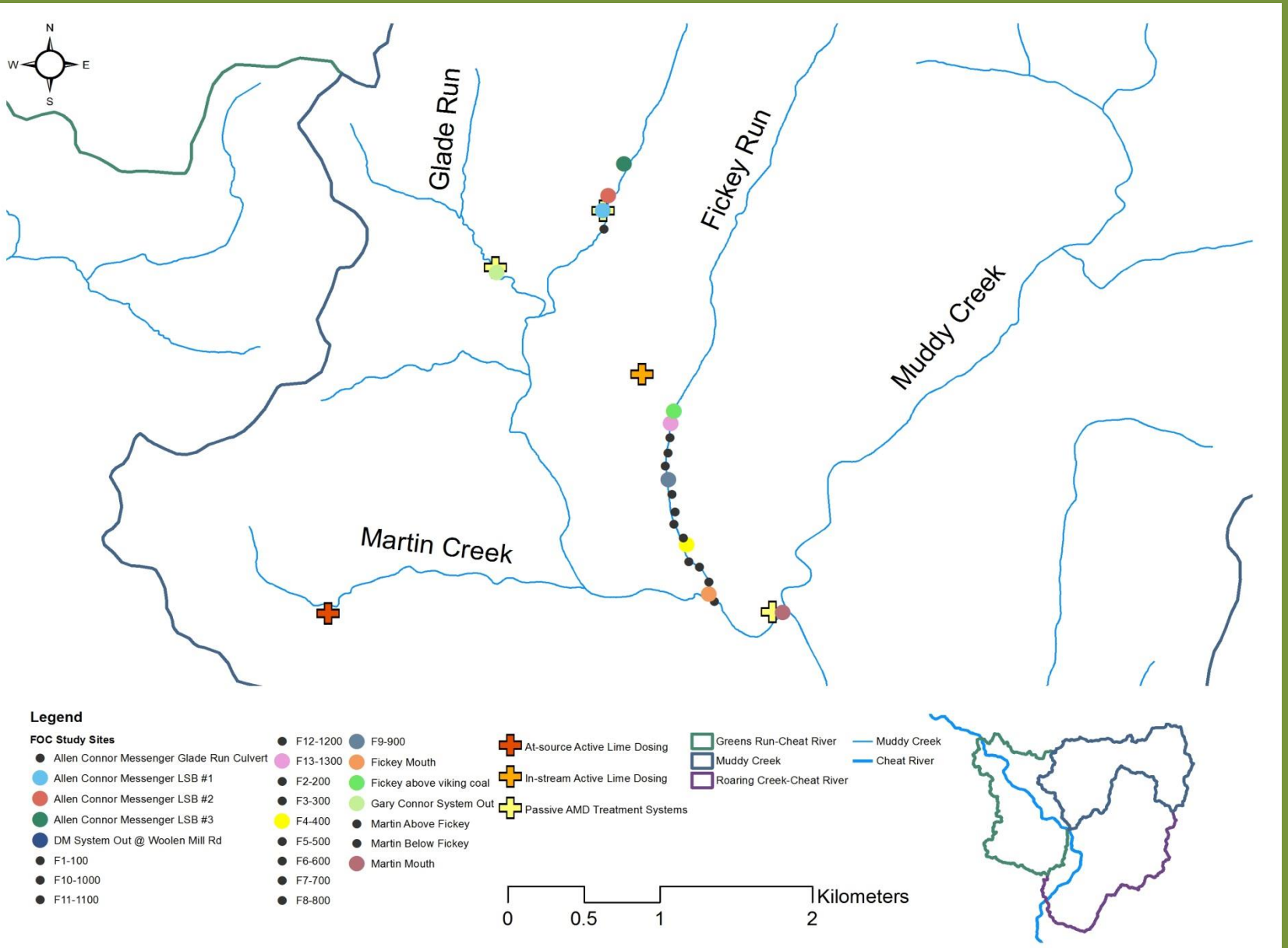
MUDDY CREEEK

CURRENT CONDITIONS FRIENDS OF THE CHEAT VISION

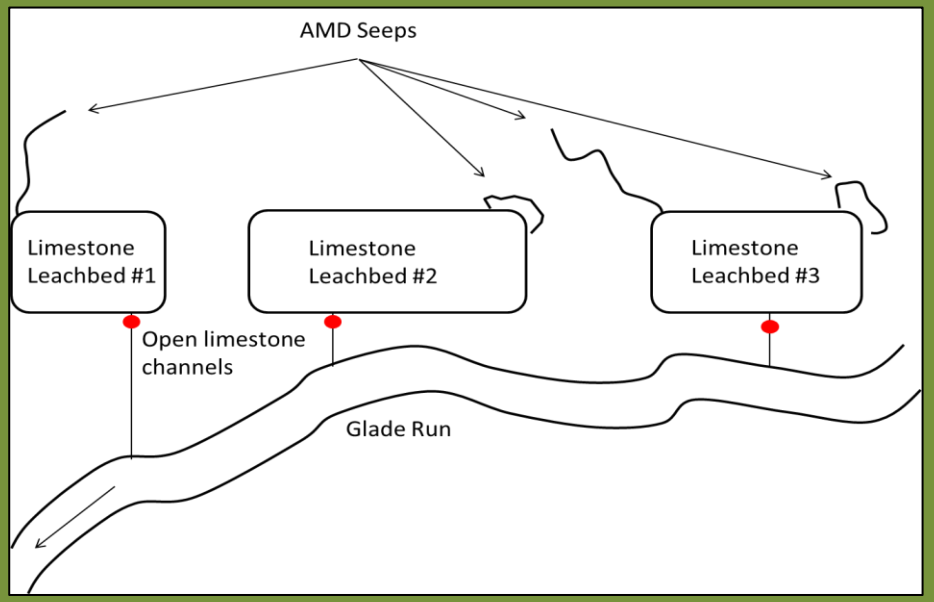
* Phone: 304/329-3621 * Fax: 304/329-3622 * Email: foc@cheat.org * www.cheat.org
119 South Price Street, Suite 206 * Kingwood, WV 26537

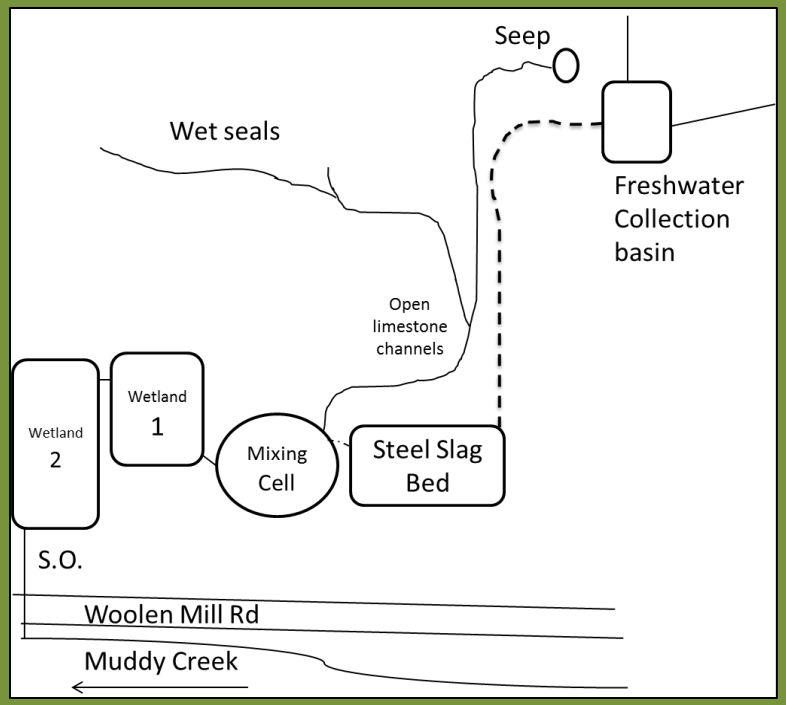
Lower Cheat Remediation Plan Objectives

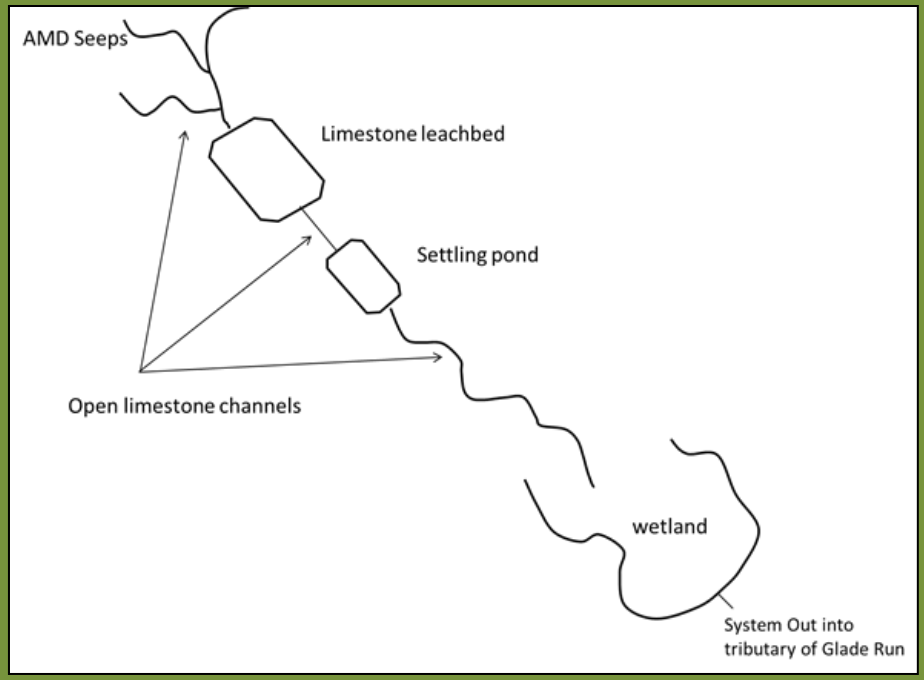
1. Accelerate the restoration of 27 stream miles in the Muddy Creek watershed
2. Implement various AMD treatment technologies
3. Evaluate and compare the efficiency through a cost-benefit analysis of treatment technologies
   - $/tons of acidity removed/yr


N
W
E
S
Glade Run
Fickey Run
Muddy Creek
Martin Creek
Legend
FOC Study Sites
Allen Connor Messenger Glade Run Culvert
Allen Connor Messenger LSB #1
Allen Connor Messenger LSB #2
Allen Connor Messenger LSB #3
DM System Out @ Woolen Mill Rd
F1-100
F10-1000
F11-1100
F12-1200
F13-1300
F2-200
F3-300
F4-400
F5-500
F6-600
F7-700
F8-800
F9-900
Fickey Mouth
Fickey above viking coal
Gary Connor System Out
Martin Above Fickey
Martin Below Fickey
Martin Mouth
At-source Active Lime Dosing
In-stream Active Lime Dosing
Passive AMD Treatment Systems
Greens Run-Cheat River
Muddy Creek
Roaring Creek-Cheat River
Muddy Creek
Cheat River
0
0.5
1
2
Kilometers

Passive Treatment At-Source



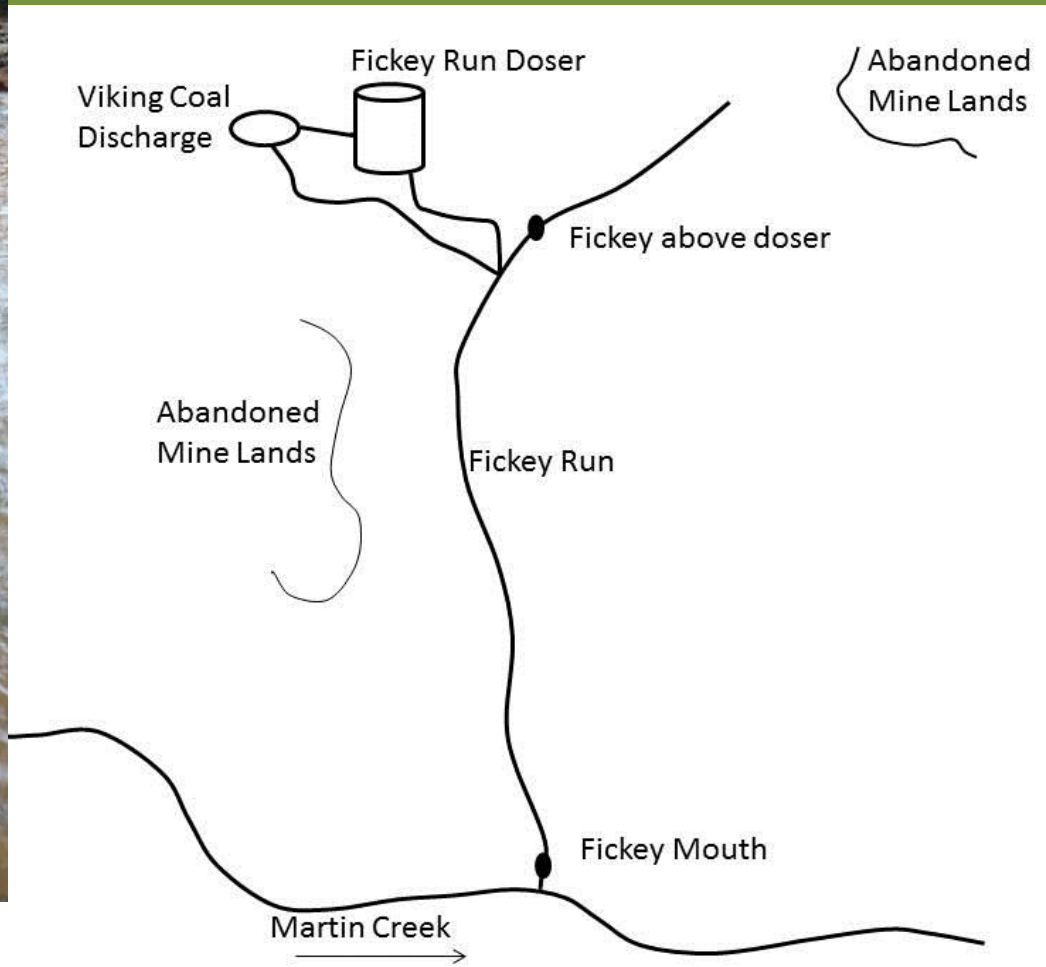




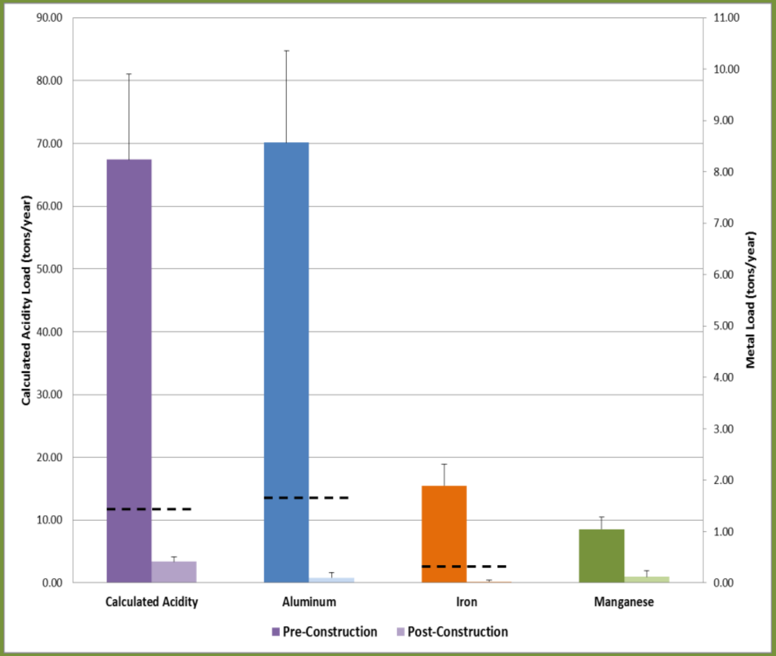
Passive Treatment At-Source

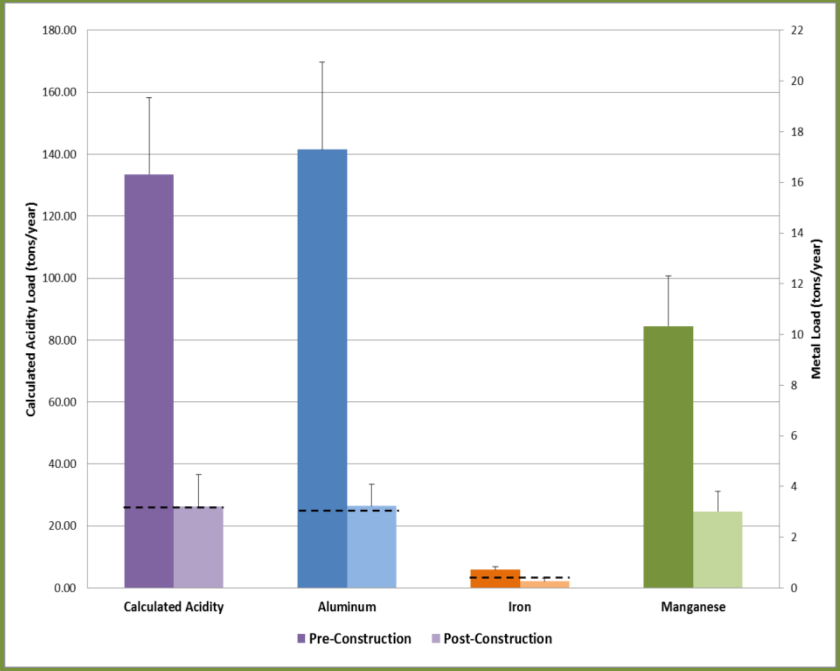
WV DEP
Rockville
At-Source Dosing

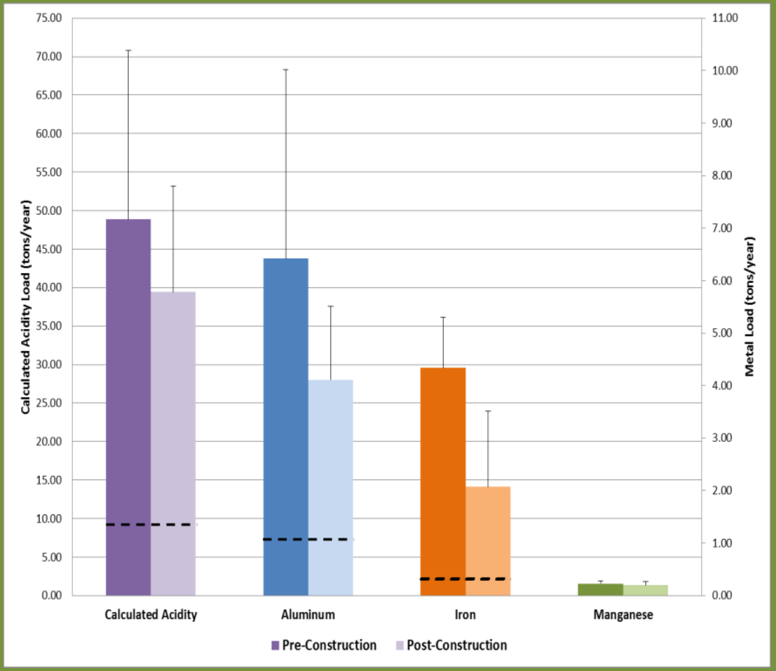
Fickey Run
In-stream Dosing



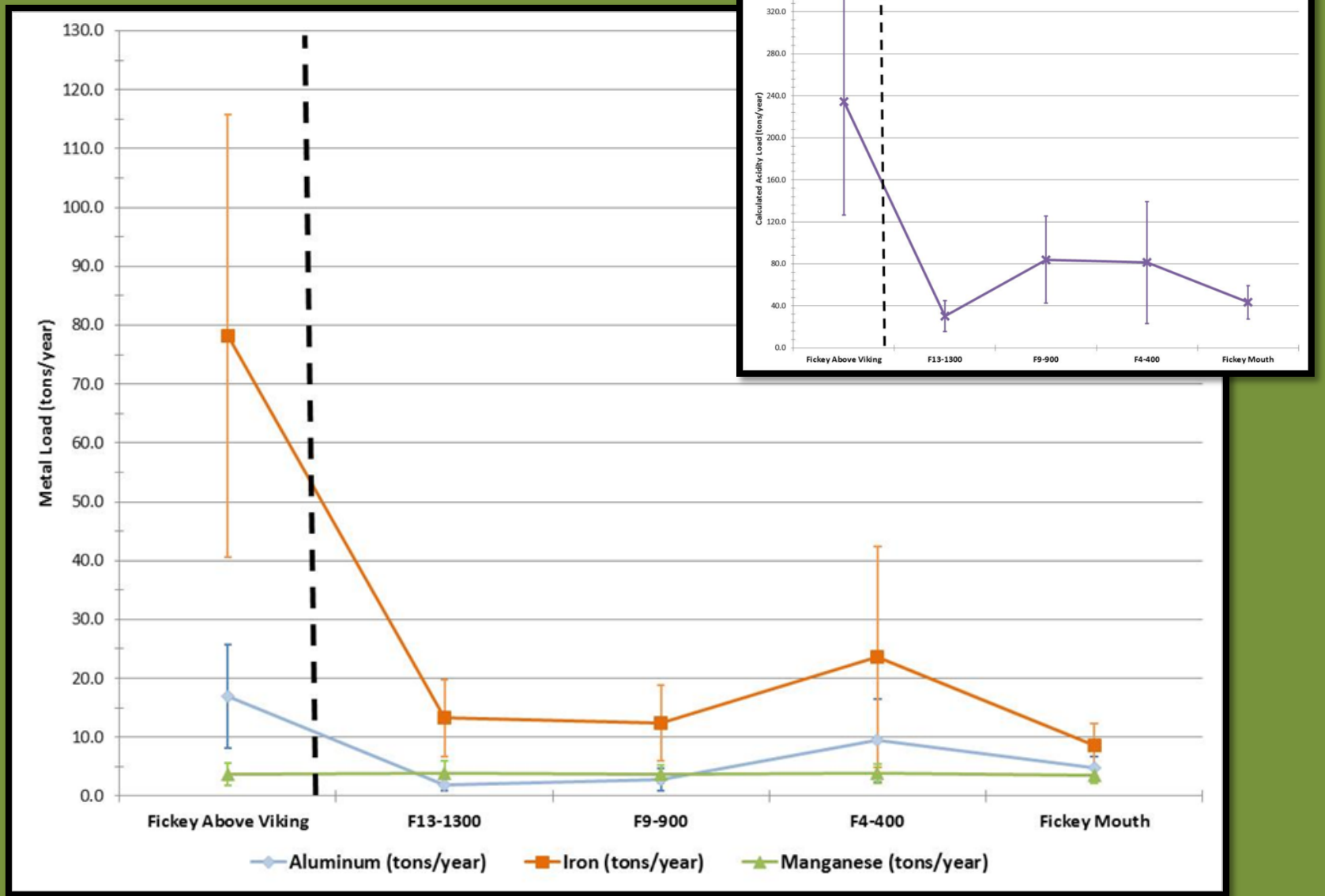
Gary Conner Average Pollutant Load Reductions



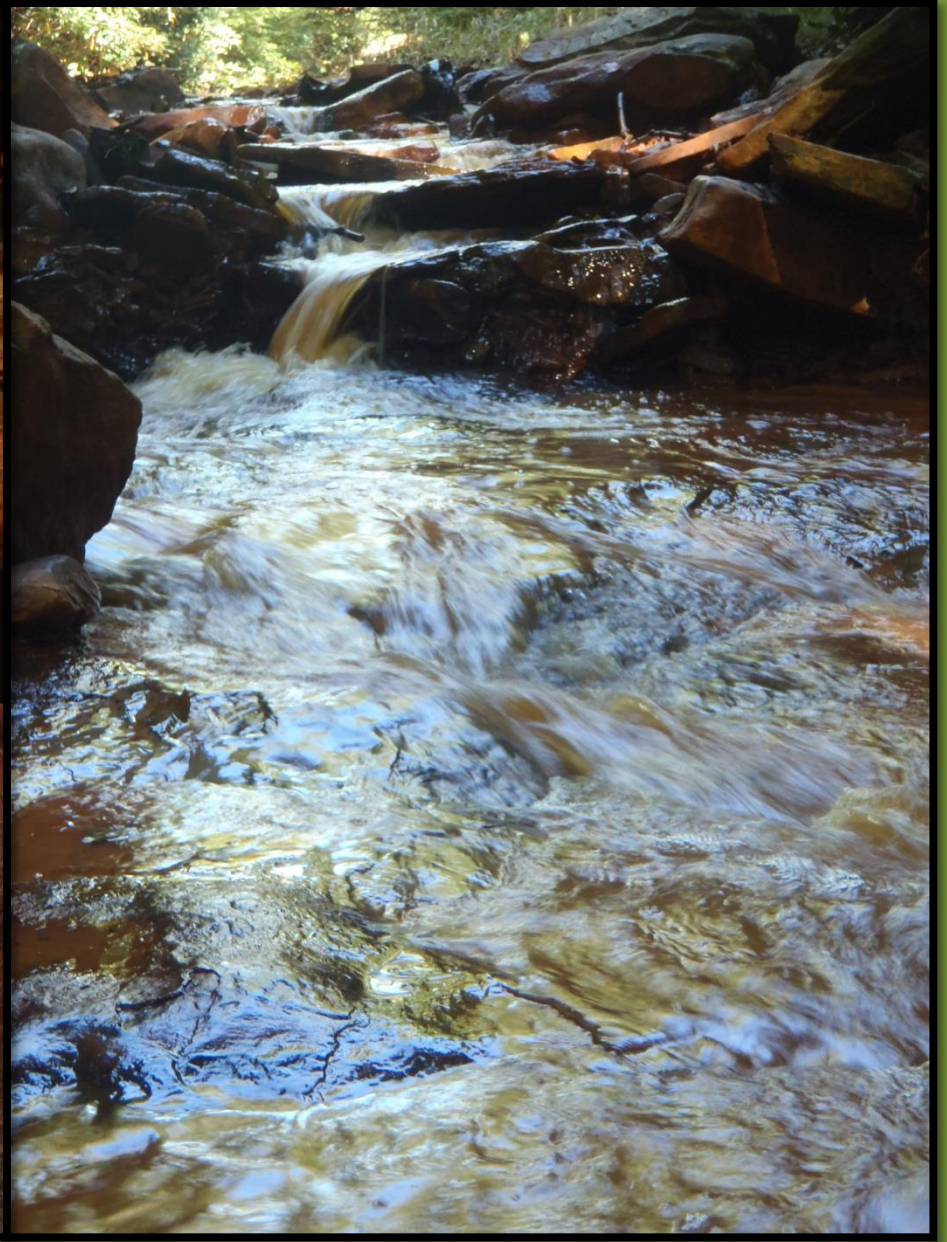




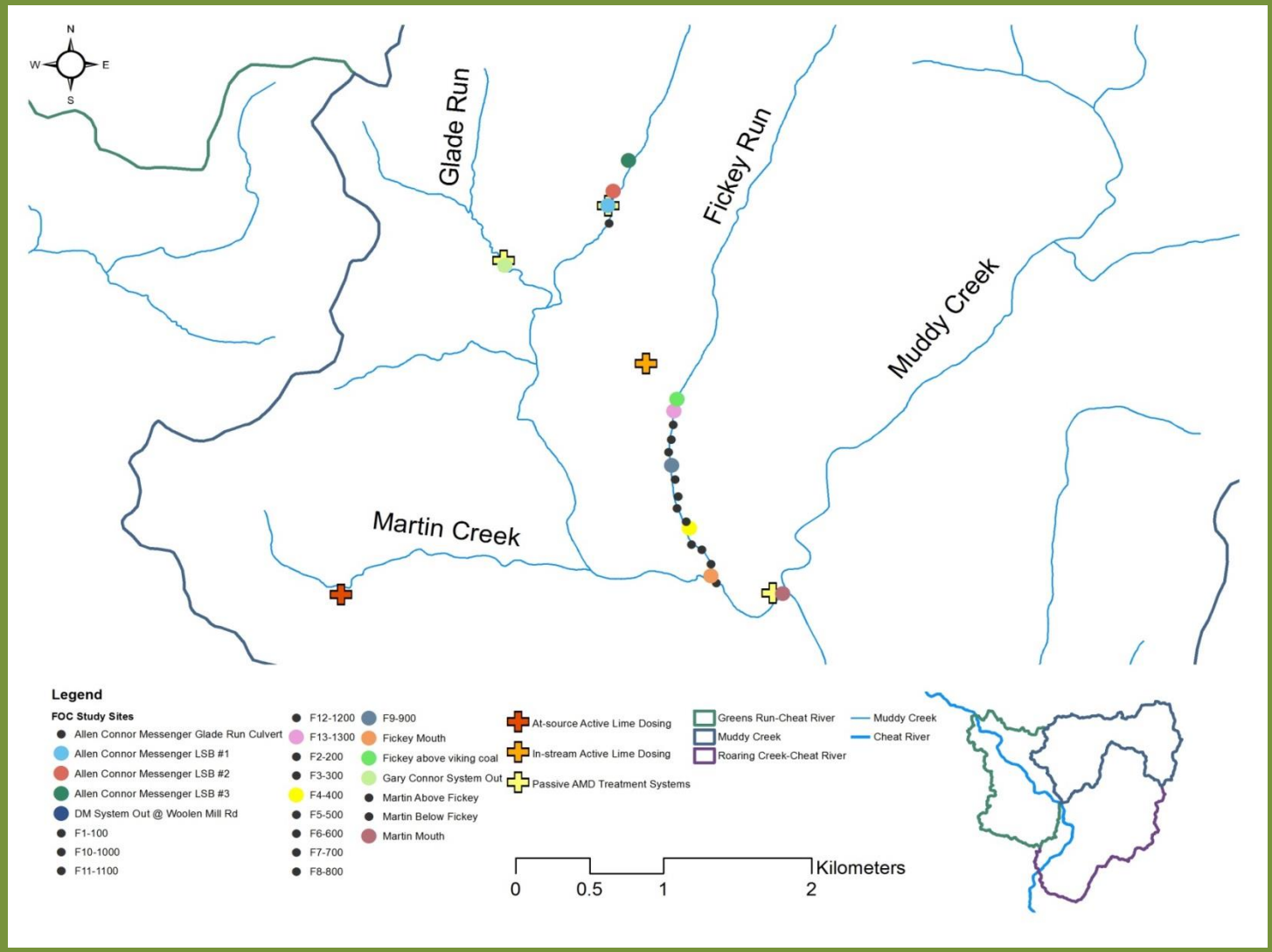
Fickey Run In-stream Dosing Average Metal Loads



Effects of In-Stream Dosing



In-stream Dosing Impact Zone Muddy Creek



In-stream Dosing Impact Zone Muddy Creek

Comparison of Treatment Methods

Treatment Type	Total Cost	Capital Cost	O&M Cost	Acid Treated	Efficiency
In-stream Dosing		2	1	1	3
At-Source Active		1	3	4	5
At-Source Passive Allen Conner – Mess.		5	5	3	1
At-Source Passive Dream Mountain		4	4	5	4
At-Source Passive Gary Conner		3	2	2	2
For cost and acid treated: 1 = highest, 5 = lowest; For Efficiency: 1 = lowest/most efficient, 5 = highest/least efficient					

Efficiency units: $/acid ton removed/yr

Quick Summary

- Pollutant Load Reductions/Water Quality Improvements
- In-stream dosing – not quite the answer..

  (we were looking for)
- Efficiency calculations
  - Determined by individual site limitations

Next Steps

- Muddy Creek will not be remediated by any single treatment strategy or stakeholder
- Needed:
  - Innovation and collaboration between the WVDEP Office of Special Reclamation and the Office of Abandoned Mine Lands and Reclamation
  - To reduce “doh!-instances”
  - Updated Watershed Based Plan
  - Persistence!

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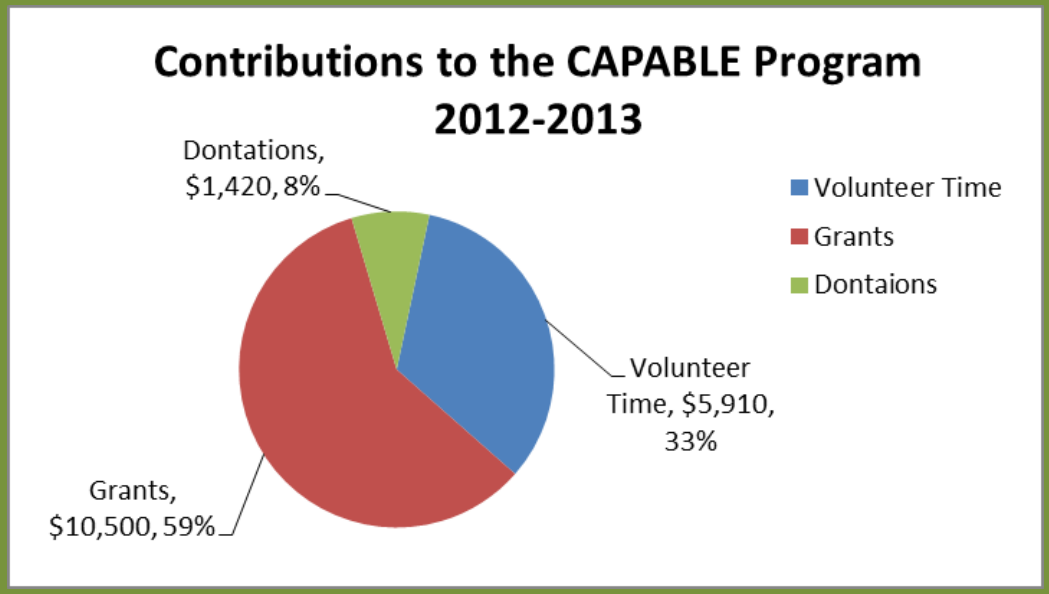
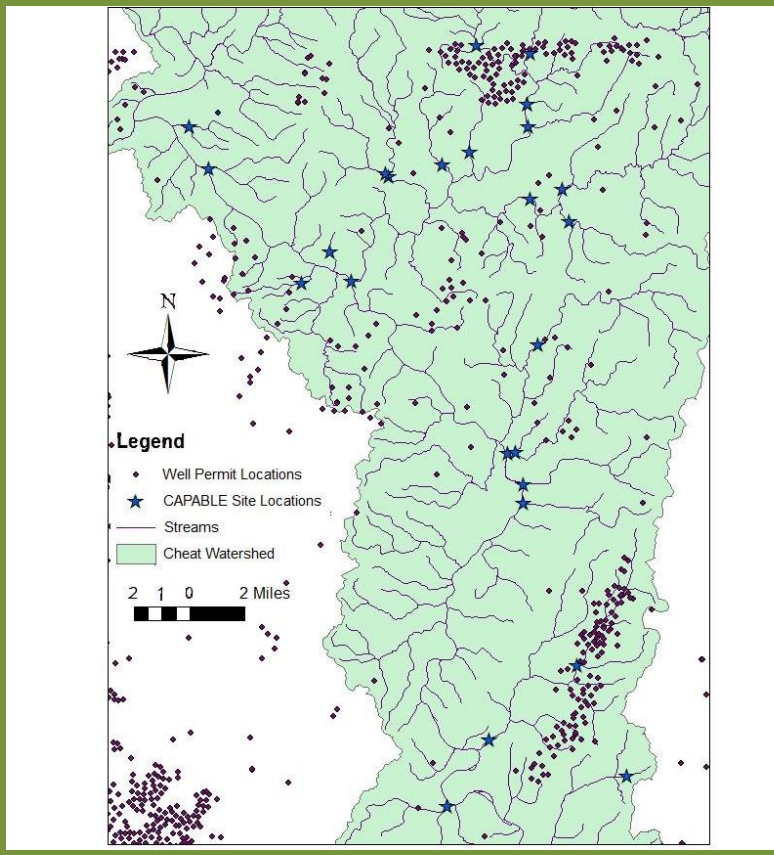
CAPABLE Monitoring Program Overview

- Created in response to oil and gas permits issued in the Cheat River watershed in 2010
- 15 volunteers monitor selected streams in subwatersheds potentially affected by oil and gas activity

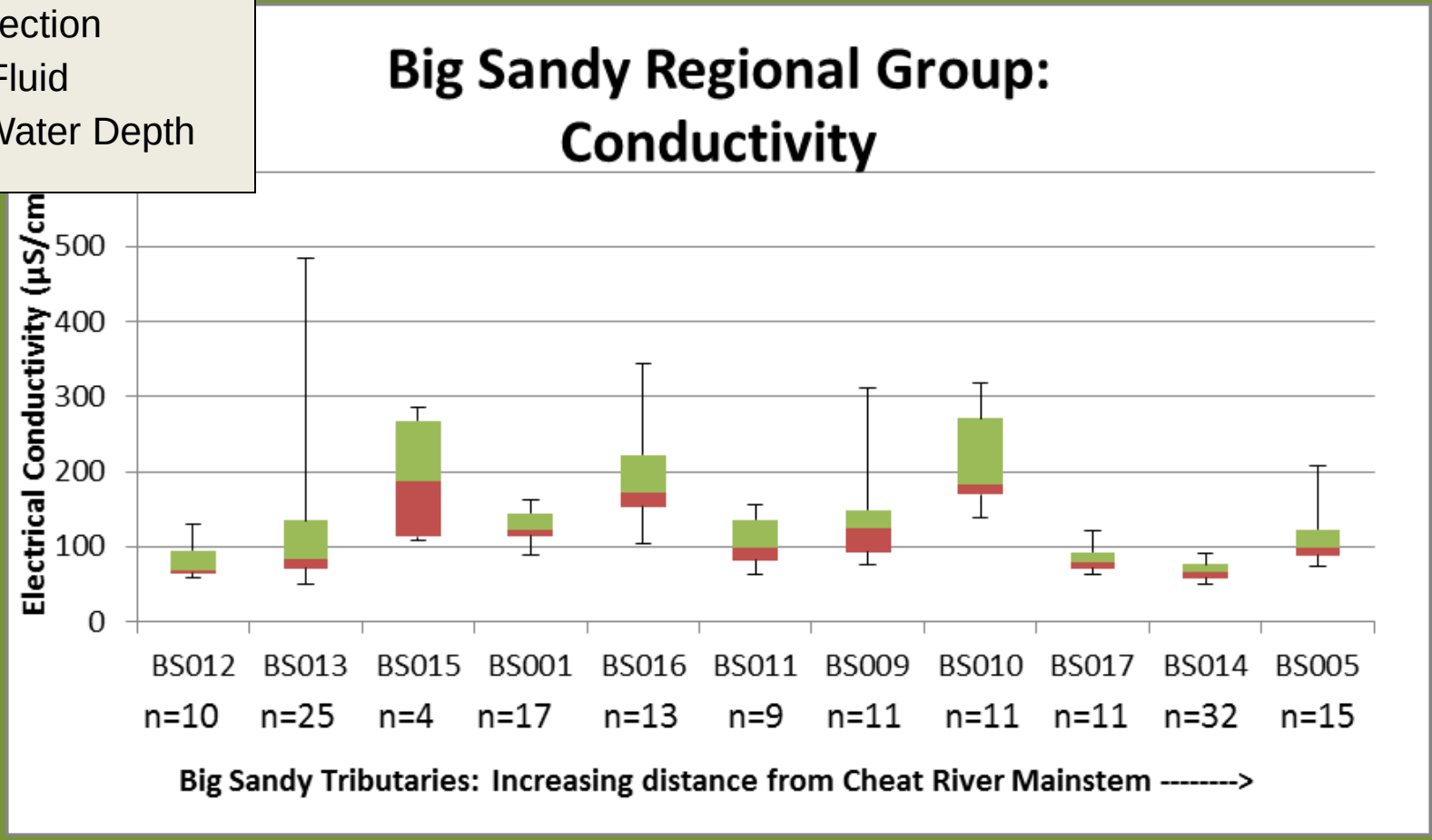




Monitoring Equipment:

- Data Observation Form
- Electric Conductivity & Temperature Pen
- pH Strips
- Grab Sample Bottles
- Extension Poles for Grab Sample Collection
- Calibration Fluid
- Gauges of Water Depth

2011-2012



Continuous Data Loggers

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Partnership Framework

1. Communication
2. Roles and Responsibilities
3. Strategic Planning

Partnership Framework

1. Communication
   - What are the communication channels?
   - What are limitations for communication opportunities?
   - What is expected timeframe/frequency of communication?
2. Roles and Responsibilities
   - Are the deliverables and associated tasks clearly defined?
   - Are there specific actors assigned to these items?
   - Are roles and responsibilities agreed upon or assumed?
3. Strategic Planning
   - Was there a clearly defined planning phase?
     - Feasibility Study
   - At what point within the project timeline were key partners engaged?
   - Were all partners involved in negotiating important aspects of the project?
     - Roles; responsibilities; communication plans
   - Is there a expectation for partnership reassessment?

Do…

- Consider communication channels
- Set realistic expectations for frequency
- Define deliverables and tasks
- Assign specific actors
- Feasibility study (to the extent necessary)
- Engage key partners as early as possible
- Plan for reassessment

Don’t…

- Don’t avoid challenging conversations with partners
- Assume anything! (follow up)
  - Feasibility
  - Partner engagement
  - Roles and Responsibilities
  - Etc..

Friends of the Cheat

Thank You

Friends of the Cheat